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IDENTIFIERS *Quinmester Program

ABSTRACT

This unit of instruction is concerned with briefly interpreting some major life science aspects of the South Florida environment and is dependent on outdoor laboratories, excursions, and ecology-oriented instructional materials. It is suggested that many of the instructional materials may need to be originated. To make collections on field trips is illegal without a permit; thus, information is provided to facilitate this request. No enrollment guidelines are suggested. State-adopted texts relevant to the course are listed. The performance objectives and course outline are presented in the booklet. Relevant publications are suggested and South Florida Environmental Science Media Units available from the Dade County Audiovisual Center are found in the unit. Suggested activities, guest speakers, and field trips are provided. Films available as well as slides, transparencies, records, and models are listed. A list of necessary materials to be purchased is included in the booklet. A master sheet is provided relating each suggested activity to the specific performance objectives. (EB)

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# AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

## LIFE SCIENCE THROUGH FIELD EXPERIENCES

5311.14
5312.14
5313.14

(Experimental)

DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1971

SE 017 617

ED 092358

# LIFE SCIENCE THROUGH FIELD EXPERIENCES

5311.14
5312.14
5313.14

SCIENCE

(Experimental)

Written by Jim O'Connor
for the
DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Florida
1972

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Dade County Public Schools
Miami, Florida 33132

Published by the Dade County School Board

Copies of this publication may be obtained through

Textbook Services
2210 S. W. Third Street
Miami, Florida 33135

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# LIFE SCIENCE THROUGH FIELD EXPERIENCES

## COURSE DESCRIPTION

By design, the course is concerned with briefly interpreting some major life science aspects of the south Florida environment, and is dependent upon outdoor laboratories and excursions and ecology-oriented instructional materials, many of which will, out of necessity, need to be originated.

THE COLLECTING OF ANY KIND OF MARINE ANIMALS BY NET, SEINE OR TRAP IS ILLEGAL WITHOUT A PERMIT. IN ORDER TO MAKE COLLECTIONS ON FIELD TRIPS (OR TO CATCH SPECIMENS FOR MARINE AQUARIUMS) TEACHERS SHOULD WRITE A LETTER REQUESTING A PERMIT TO:

FLORIDA STATE BOARD OF CONSERVATION
LARSON BUILDING
TALLAHASSEE, FLORIDA
(ATTENTION PERMIT CLERK)

## ENROLLMENT GUIDELINES

None

## STATE ADOPTED TEXTS

Brandwein, Paul F., Burnett, R. Will and Strollberg, Robert. Life: Its Forms and Changes. New York: Harcourt, Brace and World, Inc., 1968.

Mason, John M. and Peters, Ruth T. Life Science. Princeton: D. Van Nostrand Company, Inc., 1965.

Thurber, Walter A., and Kilburn, Robert E. Exploring Life Science. Boston: Allyn and Bacon, Inc., 1966.

PERFORMANCE OBJECTIVES

1. Given photographs or specimens of local marine organisms and a general explanation of life zones the student will assign each organism to its respective life zone.

2. Given photographs or specimens of fresh water organisms and an example of a food chain the student will arrange the organisms in a food chain.

3. Given photographs of habitats common to Everglades National Park and information on food webs the student will suggest a food web for one of the habitats.

4. Given photographs or specimens of insects and/or spiders and information on their feeding habits the student will deduce the habitat of each specimen.

5. Given photographs or specimens of diseased plants and information on related phytopathology the student will identify by common name the causative agent of each disease.

6. Given photographs and names of local lawn weeds the student will contribute labeled examples to a living classroom collection.

7. Given photographs and names of poisonous and/or allergy producing plants that are commonly used as ornamentals the student will prepare a chart that shows their distribution in a section of the surrounding area.

8. Given photographs or specimens of local plants the student will identify by common name those having economic value.

9. Given photographs of organisms that are common to the Anhinga Trail and information on the structure of a community the student will construct a visual that illustrates the strata.

10. Given photographs and names of organisms that inhabit the lowland and highland regions of Everglades National Park the student will predict a succession that could occur after a controlled burn.

11. Given photographs or specimens and names of exotic plants that encroach upon hardwood hammocks the student will devise methods of controlling the intruders.

COURSE OUTLINE

I. Marine Environment

A. Life Zones

1. Beach
2. Shore line
3. Shallow water

B. Organisms

1. Flora

a. Algae
b. Salt tolerant
c. Exotic

2. Fauna

a. Invertebrates
b. Vertebrates
c. Habitats

II. Fresh Water Environment

A. Water

1. Sources
2. Management

B. Life

1. Food chain

a. Producers
b. Consumers
c. Reducers

2. Food web

III. Everglades Environment

A. Habitats

1. Pineland
2. Sawgrass
3. Tree islands
4. Transition zone
5. Mangrove
6. Coastal prairie
7. Estuarine
8. Taylor slough

a. Organisms
b. Stratification

B. Topography

1. Highland
2. Lowland

C. Succession

1. Natural
2. Artificial

IV. Terrestrial Environment

A. Flora

1. Beneficial

a. Fruits
b. Vegetables
c. Ornamentals

2. Detrimental

a. To agriculture
b. To homes
c. To people

B. Fauna

1. Invertebrates

a. Worms
b. Spiders
c. Insects

2. Vertebrates

a. Reptiles
b. Birds
c. Mammals

C. Ecological Paradox

1. Exotics

a. Casuarina
b. Walking catfish

2. Controls

a. Biological
b. Chemical
c. Mechanical
d. Governmental

RELEVANT PUBLICATIONS


1. Biological Sciences Curriculum Study. Biological Science, Molecules to Man. Boston: Houghton Mifflin Company, 1968.

2. Brandwein, Paul F., Burnett, R. Will, and Strollberg, Robert. Life: Its Forms and Changes. New York: Harcourt, Brace and World, Inc., 1968.

*3. Bush, Charles. Flowers, Shrubs and Trees for Florida Homes. Tallahassee: Bulletin No. 195, Florida Department of Agriculture and Consumer Services, 1969.

4. Carson, Rachel. The Edge of the Sea. New York: The New American Library of World Literature, Inc., 1962.

*5. Dade County Park and Recreation Department. Redland Fruit and Spice Park. Miami: Park and Recreation Department, Metropolitan Dade County.

*6. Dickey, R. D., West, Erdman and Mowry, Harold. Native and Exotic Palms of Florida. Bulletin 152-A, Institute of Food and Agricultural Service. Gainesville: University of Florida.

7. Douglas, Marjorie Stoneman. The Everglades: River of Grass. New York: Holt, Rinehart and Winston, 1947.

*8. Fairchild Tropical Garden. Catalog of Plants of the Fairchild Tropical Garden. Miami, Florida: 1966.

9. Florida Audubon Society. Florida Audubon Society Catalogue. P. O. Drawer 7. Maitland, Florida.

*10. Florida Department of Education. Source Book of Marine Sciences, The. Tallahassee: Division of Elementary and Secondary Education, Bureau of Curriculum and Instruction, Department of Education, 1970.

*11. Florida Game and Fresh Water Fish Commission. Florida Animal Tracks. Tallahassee: Game and Fresh Water Fish Commission, Florida.

*12. Florida State Department of Agriculture. Dictionary of Florida Plants. Tallahassee: Bulletin No. 161, Department of Agriculture, 1965.


*Free or inexpensive publications

RELEVANT PUBLICATIONS (Continued)


*13. Florida State Department of Agriculture. Florida Crops. Tallahassee: Bulletin No. 1, Florida State Department of Agriculture, 1964.

14. Mason, John M. and Peters, Ruth T. Life Science. Princeton: D. Van Nostrand Company, Inc., 1965.

15. Maxwell, Lewis S. Florida Insects: Their Habits and Control. 6230 Travis Blvd., Tampa: Maxwell Co., 1962.

16. Maxwell, Lewis S. Florida's Poisonous Plants, Snakes, Insects. 6230 Travis Blvd., Tampa: Maxwell Co., 1962.

17. National Audubon Society. Audubon Aids in Natural Science. (Catalogue) 1130 Fifth Avenue, New York, New York, 10028: National Audubon Society.

18. Robertson, William B. Everglades -- the Park Story. Coral Gables: University of Miami Press, 1959.

19. Rohm and Haas Company. Compendium of Plant Diseases. Philadelphia: Rohm and Haas Co.

*20. Smart, Alice. Fruit Trees for Florida Homes. Tallahassee: Bulletin No. 183, Department of Agriculture, 1964.

21. Stephens, William M. Southern Seashores. New York: Holiday House, 1968.

22. Thurber, Walter A. and Kilburn, Robert E. Exploring Life Science. Boston: Allyn and Bacon, Inc., 1966.

*23. U.S. Government Printing Office. Better Lawns. Washington, D.C.: Home and Garden Bulletin No. 51, Superintendent of Documents, U. S. Government Printing Office, 1966.

*24. U.S. Government Printing Office. Insects and Diseases of Vegetables in the Home Garden. Washington, D.C.: Home and Garden Bulletin No. 46, Superintendent of Documents, U. S. Government Printing Office.

*25. U.S. Government Printing Office. Lawn Weed Control with Herbicides. Washington, D.C.: Home and Garden Bulletin No. 123, Superintendent of Documents, U. S. Government Printing Office, 1968.


*Free or inexpensive publications

RELEVANT PUBLICATIONS (Continued)


*26. University of Florida. Commercial Vegetables Insect and Disease Control Guide. Gainesville: Circular 193F, Florida Agricultural Extension Service, University of Florida.

*27. University of Florida. Institute of Food and Agricultural Sciences Publications, The Current List. Gainesville: Agricultural Extension Service, University of Florida.

*28. University of Florida. Poisonous Plants Around the Home. Gainesville: Circular S-100, Florida Agricultural Extension Service, University of Florida.

*29. University of Florida. Weeds of the Southern United States. Gainesville: Florida Agricultural Extension Service, Institute of Food and Agricultural Services, University of Florida.

*30. West, Erdman and Emmel, M. W. Plants That Poison Farm Animals. Gainesville: Bulletin 510A, University of Florida Agricultural Experiment Station.

31. Zim, Hebert S. A Guide to Everglades National Park. New York: Golden Press, 1960.


*Free or inexpensive publications

SOUTH FLORIDA ENVIRONMENTAL SCIENCE MEDIA UNITS
Available from Dade County Audiovisual Center

| | | AV# |
|---|---|---|
| 1. | Media Unit I 8B2-MU-1<br>SOUTH FLORIDA MARINE BIOLOGY<br>Subtopic A (filmstrip and audio tape)<br>One Hour at Bear Cut | 3-60034 |
| 2. | Media Unit II 8B2-MU-2<br>SOUTH FLORIDA FRESH WATER BIOLOGY<br>Subtopic D (filmstrip and audio tape)<br>Safety in Size | 3-60035 |
| 3. | Media Unit III 8B2-MU-3<br>SOUTH FLORIDA FAUNA<br>Subtopic B (filmstrip and audio tape)<br>Flamingo Road | 3-60036 |
| 4. | Media Unit IV 8B2-MU-4<br>SOUTH FLORIDA INVERTEBRATES<br>Subtopic C (filmstrip and audio tape)<br>The Patient Predators<br>Subtopic E (filmstrip and audio tape)<br>Insects | 3-60037 |
| 5. | Media Unit V 8B2-MU-5<br>SOUTH FLORIDA FLORA DETRIMENTAL TO AGRICULTURE<br>Subtopic C (filmstrip and audio tape)<br>Vegetable Diseases | 3-60038 |
| 6. | Media Unit VI 8B2-MU-6<br>SOUTH FLORIDA FLORA DETRIMENTAL TO THE HOME<br>Subtopic B (filmstrip and audio tape)<br>Lawn Weeds | 3-60039 |
| 7. | Media Unit VII 8B2-MU-7<br>SOUTH FLORIDA FLORA DETRIMENTAL TO PEOPLE<br>Subtopic C (filmstrip and audio tape)<br>Local Poisonous Plants<br>Subtopic D (filmstrip and audio tape)<br>Allergy-Producing Plants | 3-60040 |
| 8. | Media Unit VIII 8B2-MU-8<br>SOUTH FLORIDA BENEFICIAL FLORA<br>Subtopic C (filmstrip and audio tape)<br>Fruit and Crop Plants | 3-60041 |
| 9. | Media Unit IX 8B2-MU-9<br>SOUTH FLORIDA AREAS OF BIOLOGICAL INTEREST<br>Subtopic A (filmstrip and audio tape)<br>The Anhinga Trail (Part I)<br>Subtopic B (filmstrip and audio tape)<br>The Anhinga Trail (Part II) | 3-60042 |

SOUTH FLORIDA ENVIRONMENTAL SCIENCE MEDIA UNITS (Cont.)

AV#

10. Media Unit X 8B2-MU-10 — 3-60043
SOUTH FLORIDA HAMMOCKS
Subtopic D (filmstrip and audio tape)
Burning for Balance (Part I)
Subtopic E (filmstrip and audio tape)
Burning for Balance (Part II)

11. Media Unit XI 8B2-MU-11 — 3-60044
SOUTH FLORIDA BIOLOGY
Subtopic B (filmstrip and audio tape)
The Deadly Intruders

SUGGESTED ACTIVITIES

1. As a class prepare a list of safety rules to be followed on a field trip to Bear Cut.

2. Prepare a large color drawing that illustrates the organisms observed at Bear Cut. Include the respective life zones.

3. Design a card game based on the organisms in a fresh water food chain.

4. Before visiting Everglades National Park, obtain a copy of the tour map published by the park that identifies points of interest. Prepare descriptions of the scenes to be viewed along the major park road.

5. Write a science fiction story entitled, "Insects Everywhere."

6. Have a debate on the advantages and disadvantages of fungicides.

7. Contribute a labeled weed (common name, scientific binomial and plant family) to a living classroom collection.

8. Write a narrative entitled, "Ragweed" for a local five minute radio program.

9. Contribute labeled examples to a classroom display of local plants of economic value.

10. Write a newspaper story entitled: "The Anhinga Trail at Night."

11. Prepare a large color poster with the theme: "Fires are Nature's Business."

12. Prepare a list of exotic plants and/or animals purposely introduced in Florida.

FILMS AVAILABLE FROM DADE COUNTY AUDIOVISUAL CENTER

| | | AV# |
|---|---|---|
| 1. | Allergies<br>10', BW | 1-03113 |
| 2. | Animal Habitats<br>10', C | 1-02370 |
| 3. | Animal Life Cycle, An - Development of Sea Urchin<br>28', C | 1-30539 |
| 4. | Animals That Live in the Surf<br>11', C | 1-02699 |
| 5. | Anyone for Diving?<br>30', C | 1-30859 |
| 6. | Aquatic Insects<br>11', BW | 1-05787 |
| 7. | Arachnids<br>10', BW | 1-02740 |
| 8. | Arthropods: Insects and Their Relatives<br>11', C | 1-02736 |
| 9. | Balance in Nature<br>17', C | 1-11141 |
| 10. | Beach and Sea Animals<br>11', BW | 1-02664 |
| 11. | Biologists in a Tropical Laboratory<br>12', BW | 1-02189 |
| 12. | Bird Community, The<br>12', C | 1-02904 |
| 13. | Birds That Eat Fish<br>6', C | 1-02910 |
| 14. | Black Widow Spider<br>12', C | 1-02742 |
| 15. | Butterfly -- Life Cycle of an Insect<br>6', C | 1-02805 |
| 16. | Camouflage in Nature Through Form and Color Matching<br>11', C | 1-02655 |

FILMS AVAILABLE FROM DADE COUNTY AUDIOVISUAL CENTER (Continued)

| | | AV# |
|---|---|---|
| 17. | Everglades, The: Conserving a Balanced Community<br>11', C | 1-13868 |
| 18. | Food Getting Among Animals<br>13', C | 1-11140 |
| 19. | Fruit<br>10', C | 1-03732 |
| 20. | Fruits of Plants, The<br>12', C | 1-11106 |
| 21. | Grass<br>10', C | 1-03725 |
| 22. | Grasshopper, The -- A Typical Insect<br>6', C | 1-02750 |
| 23. | Insect Collecting<br>14', C | 1-11155 |
| 24. | Insect Enemies and Their Control<br>11', C | 1-02765 |
| 25. | Insect Foods<br>14', C | 1-11153 |
| 26. | Insects<br>11', C | 1-92760 |
| 27. | Interrelationships for Survival<br>28', C | 1-30558 |
| 28. | Microorganisms That Cause Disease<br>11', C | 1-03413 |
| 29. | Natural Enemies of Insect Pests<br>27', C | 1-30703 |
| 30. | Nature's Birds of Prey<br>30', C | 1-30710 |
| 31. | Partnerships Among Plants and Animals<br>11', C | 1-02657 |
| 32. | Praying Mantis<br>9', C | 1-02781 |
| 33. | Prowlers of the Everglades<br>26', C | 1-30952 |

FILMS AVAILABLE FROM DADE COUNTY AUDIOVISUAL CENTER (Continued)

| | | AV# |
|---|---|---|
| 34. | Reptiles are Interesting<br>10', C | 1-02863 |
| 35. | Seashore Life<br>10', C | 1-02687 |
| 36. | Snakes of Florida<br>6', C | 1-02877 |
| 37. | Spider Engineers<br>12', BW | 1-11151 |
| 38. | Story of Citrus Fruits, The<br>11', C | 1-03735 |
| 39. | Strand Breaks, A: The Web of Life (Part II)<br>17', C | 1-10202 |
| 40. | Strand Grows, A: The Web of Life (Part I)<br>15', C | 1-11063 |
| 41. | Strange Partners: Symbiosis in the Sea<br>12', C | 1-13718 |
| 42. | Succession: From Sand Dune to Forest<br>16', C | 1-11108 |
| 43. | Termites<br>23', BW | 1-11165 |
| 44. | Typical Garden Spider, A<br>8', BW | 1-02733 |
| 45. | What is Ecology<br>11', C | 1-11064 |
| 46. | Wildlife Refuge<br>14', C | 1-11206 |

## TRANSPARENCIES AVAILABLE FROM DADE COUNTY AUDIOVISUAL CENTER

| | | AV# |
|---|---|---|
| 1. | Classification: Insects | 2-00175 |
| 2. | Classification: Vertebrates | 2-00176 |
| 3. | Fungus Plants, The | 2-00025 |

## RECORDS AVAILABLE FROM DADE COUNTY AUDIOVISUAL CENTER

| | | AV# |
|---|---|---|
| 1. | Voices of the Night | 4-40625 |

## SLIDES AVAILABLE FROM DADE COUNTY AUDIOVISUAL CENTER

2 x 2

| | | AV# |
|---|---|---|
| 1. | Alligators | 5-20008 |
| 2. | Everglades National Park | 5-20095 |
| 3. | Florida Birds and Wildflowers | 5-70017 |
| 4. | Plants and Trees | 5-20046 |
| 5. | Subtropical Flowering Plants (Part I) | 5-20074 |
| 6. | Subtropical Flowering Plants (Part II) | 5-20067 |
| 7. | Subtropical Fruits We Eat (Part I) | 5-20050 |
| 8. | Subtropical Fruits We Eat (Part II) | 5-20009 |

Projecto-chart

| | | |
|---|---|---|
| 9. | Honeybee, The | 5-30009 |
| 10. | Sponge, The | 5-30024 |
| 11. | Starfish Anatomy | 5-30025 |

Microscope

| | | |
|---|---|---|
| 12. | Flowering Plants | 5-00007 |
| 13. | Insects, Invertebrate Animals | 5-00004 |
| 14. | Lower Plants and Animals | 5-00006 |

MODELS

| | | AV# |
|---|---|---|
| 1. | Animals of the Sea Set 1 | 6-00123 |
| 2. | Animals of the Sea Set 2 | 6-00161 |
| 3. | Florida Bay Model | 6-00152 |
| 4. | Florida Shells Set 4 | 6-00001 |
| 5. | Honey Bee, The | 6-00109 |
| 6. | Household Pests | 6-00110 |
| 7. | Insects Exhibit | 6-00111 |
| 8. | Marine Life | 6-00087 |
| 9. | Mollusks Exhibit | 6-00002 |
| 10. | Poisonous Plants Set 1 | 6-00105 |
| 11. | Poisonous Plants Set 2 | 6-00106 |
| 12. | Poisonous Plants Set 3 | 6-00170 |

## SPEAKERS

Write the agency well in advance to alleviate conflicts in scheduling or changes in visiting speaker programs. Speakers prefer to work with large groups.

1. Agricultural Research and Education Center
   18905 S. W. 280th Street
   Homestead, Florida 33030

2. County Agents Offices
   2690 N. W. 7th Avenue
   Miami, Florida 33127
   and
   18710 S. W. 288th Street
   Homestead, Florida 33030

3. National Marine Fisheries Service
   Southeast Fishery Service
   (Formerly Tropical Atlantic Biological Laboratories)
   75 Virginia Beach Drive
   Miami, Florida 33149

4. Tropical Audubon Society
   Speakers are available.
   Contact in the evening:
   Charles Lee 621-1673
   Harold Quincy 696-6908
   Flora O'Brien 443-5418

5. U. S. Geological Survey
   Water Resources Division
   51 S. W. 1st Avenue
   Room 730
   Miami, Florida 33130

## FIELD TRIPS

Write the agency well in advance to alleviate conflicts in scheduling or changes in the availability of guided tours.

THE COLLECTING OF ANY KIND OF MARINE ANIMALS BY NET, SEINE OR TRAP IS ILLEGAL WITHOUT A PERMIT. IN ORDER TO MAKE COLLECTIONS ON FIELD TRIPS (OR TO CATCH SPECIMENS FOR MARINE AQUARIUMS) TEACHERS SHOULD WRITE A LETTER REQUESTING A PERMIT TO:

FLORIDA STATE BOARD OF CONSERVATION
LARSON BUILDING
TALLAHASSEE, FLORIDA
(ATTENTION PERMIT CLERK)

1. Agricultural Research and Education Center
   18905 S. W. 280th Street
   Homestead, Florida 33030

2. Agricultural Science Talks
   County Agent's Office
   18710 S. W. 288th Street
   Homestead, Florida 33030

3. City of Miami
   Park and Recreation Department
   Natural Science Tours
   Mr. Ralph Beaudry
   P. O. Box 708
   Coconut Grove Station
   Miami, Florida 33133

4. Everglades National Park
   Office of Interpretation
   Box 279
   Homestead, Florida 33030

5. Fairchild Tropical Garden
   Reference Library open to public
   Write for schedule of guided tours
   10901 Old Cutler Road
   Miami, Florida 33156

6. Metropolitan Dade County
   Parks and Recreation Department
   Natural Science Tours
   Miss Patti Amon
   50 S. W. 32nd Road
   Miami, Florida 33129

FIELD TRIPS (Continued)

7. Museum of Science
   3280 South Miami Avenue
   Miami, Florida 33129

8. National Marine Fisheries Service
   Southeast Fishery Service
   75 Virginia Beach Drive
   Miami, Florida 33149

9. Seaquarium
   30 Rickenbacker Causeway
   Miami, Florida 33149

10. Tropical Audubon Society
    Natural Science Tours
    Contact in the evening:
    Charles Lee 621-1673
    Harold Quincy 696-6908
    Flora O'Brien 443-5418

11. U. S. D. A. Crops Research
    Weed Investigations
    P. O. Box 9087
    Fort Lauderdale, Florida 33031

MATERIALS TO PURCHASE

| | Price | Publisher |
|---|---|---|
| **Audio Tape - Reel** | | |
| 1. Conservation | $ 5.45 | Educational Activities |
| **Books** | | |
| 2. Allergy - H.W. Bottomley | 4.95 | Funk and Wagnalls |
| 3. Animal Ecology - Charles S. Elton | 2.50 | Barnes and Noble |
| 4. Biological Aspects of Water Pollution | No Price Given | Charles C. Thomas |
| 5. Common Spiders of the U.S. - James H. Emerton | 2.00 | Dover Publications |
| 6. Communities and Ecosystems - Robert H. Whitakee | 3.95 | Macmillan |
| 7. Community, The - Rene Konig Tr. by Edward Fitzgerald | 6.50 | Schocken Books |
| 8. Ecology: Habitats, Niches and Food Chains- Janet Nickelsberg | 4.50 | J. B. Lippincott |
| 9. Ecology of Animals, The-Charles S. Elton | 3.00 | Barnes and Noble |
| 10. Ecology of Invasions by Animals and Plants, The - Charles S. Elton | 5.00 | Barnes and Noble |
| 11. Golden Nature Guide: Spiders and Their Kin - Herbert Levi, Lorna Levi and Herbert Zim | 4.95 | Western Publishing |
| 12. How to Control Plant Diseases in Home & Garden - Malcom Shertleff | 10.50 | NASCO |
| 13. How to Know the Spiders - B.J. Kaston | 3.50 | NASCO |
| 14. How to Know the Weeds - Harry E. Jacques | 3.75 | NASCO |
| 15. How to Make an Insect Collection - Staff of Ward's Natural Science Establishment | 0.50 | Ward's Natural Science |
| 16. Insects, The - Peter Farb | 6.60 | Silver Burdett |
| 17. Living Community: A Venture into Ecology - S. Carl Hirsch | 3.75 | Viking Press |
| 18. Parks and Gardens - Robert S. Lemmon | 5.95 | J. C. Ferguson |
| 19. Plant Disease Handbook-Cynthia Westcott | 17.50 | Van Nostrand Reinhold |
| 20. Plants that Feed the World - Rose E. Frisch | 3.95 | Van Nostrand Reinhold |
| 21. Weed Control - A.S. Crofts & W.S. Robins | 2.00 | Barnes and Noble |
| 22. Weed Control as a Science-J.D. Klingman | 8.95 | NASCO |
| 23. Weed Identification and Control | 5.95 | NASCO |
| 24. What is Allergy? A Guide for the Allergic Person - Raymond T. Benack | 6.75 | Charles C. Thomas |
| 25. Whole Truth About Allergy, The - Herman Hirschfield | 3.50 | ARCO Publishing |
| **Cards** | | |
| 26. Food Plants | 0.20 | CCM School Materials |
| 27. Orders of Insects | 0.20 | CCM School Materials |
| 28. Poisonous Plants | 0.20 | CCM School Materials |

MATERIALS TO PURCHASE (Continued)

Charts

| | | |
|---|---|---|
| 29. Basic Ecology Chart Set | $ 108.00 | Denoyer-Geppert |
| 30. Chart of the Beneficial and Harmful Insects | 17.50 | Denoyer-Geppert |
| 31. Food Plants of the New World | 1.30 | CCM School Materials |
| 32. Marine Life of the Seashore | 15.00 | Bailey Film Association |
| 33. Poisonous Plants | 1.30 | CCM School Materials |

Equipment

| | | |
|---|---|---|
| 34. Micro-Biome Environmental Experimental Chamber | 12.15 | Ward's Natural Science |

Film Loops - Super 8mm

| | | |
|---|---|---|
| 35. Everglade Swamps | 22.00 | Denoyer-Geppert |
| 36. How Spiders Capture Prey - With Webs | 21.50 | CENCO Educational Aids |
| 37. How Spiders Capture Prey - Without Webs | 21.50 | CENCO Educational Aids |
| 38. Plankton: Food Webs and Feeding Relationships | 22.95 | Ealing Film Loops |
| 39. Plant Poisoning | 17.50 | Encyclopaedia Britannica |
| 40. Safety Rules with Outdoor Plants | 17.50 | Encyclopaedia Britannica |
| 41. Sand Bottom Environment | 21.50 | CENCO Educational Aids |
| 42. Sandshore Environment | 21.50 | CENCO Educational Aids |
| 43. Spiders Collecting of Prey | 19.50 | CENCO Educational Aids |
| 44. Structure, Function, and Feeding Behavior in Herons | 18.00 | Houghton Mifflin |

Filmstrips

| | | |
|---|---|---|
| 45. Animal and Plant Communities: Pond | 6.75 | McGraw-Hill |
| 46. Changes in Ecosystems | 8.50 | McGraw-Hill |
| 47. Collecting Spiders | 6.00 | Encyclopaedia Britannica |
| 48. Ecological Succession | 7.00 | McGraw-Hill |
| 49. Fresh Water Ecology | 8.50 | McGraw-Hill |
| 50. Habitats and Niches | 8.50 | McGraw-Hill |
| 51. Interdependence of Living Things | 36.50 | McGraw-Hill |
| 52. Let's Explore a Lawn | 6.00 | Society for Visual Education |
| 53. Living Things and Their Habitats | 40.00 | Ward's Natural Science |
| 54. Nature's Balance | 4.00 | Visual Education |
| 55. Plants and Their Habitats | 6.00 | McIntyre |
| 56. Spiders and Their Work | 3.00 | Long Filmslide |
| 57. Web of Life, The | 6.75 | McGraw-Hill |

MATERIALS TO PURCHASE (Continued)

Filmstrips - Sound

| | | |
|---|---|---|
| 58. Common Pasture and Meadow Weeds and Their Control | 6.00 | NASCO |
| 59. Ecology of a Pond | 9.00 | Imperial Film |
| 60. Ecology of a Seashore | 9.00 | Imperial Film |
| 61. Identification of Weeds - Part I | 3.15 | NASCO |
| 62. Identification of Weeds - Part II | 2.60 | NASCO |
| 63. Interactions and Environments | ---- | Jam Handy |
| 64. Life in Two Subtropical Communities | 9.00 | Society for Visual Education |
| 65. Life Within the Soil | 11.00 | Eye Gate House |

Kits

| | | |
|---|---|---|
| 66. Audubon Ecology Study Program | 2.00 | National Audubon Society |
| 67. Plant Food Demonstration | 4.35 | NASCO |
| 68. Sample Ecology-Conservation Kit | 5.00 | NASCO |

Materials - Printed

| | | |
|---|---|---|
| 69. Audubon Nature Bulletins on Insects and Spiders | 1.95 | National Audubon Society |
| 70. Poisonous Plants | 0.07 | National Safety Council |

Slides

| | | |
|---|---|---|
| 71. Animal Ecology | 28.60 | CCM School Materials |
| 72. Common Insects and Spiders | 8.50 | Society for Visual Education |
| 73. Common Weeds | 29.50 | CCM School Materials |
| 74. Diseases of Vegetables | 8.00 | NASCO |
| 75. Injurious Plants Set | 6.00 | CENCO Educational Aids |
| 76. Major Plant Diseases | 50.00 | NASCO |
| 77. Plant Ecology | 24.50 | CCM School Materials |
| 78. Plant Relations with Environment | 11.25 | CENCO Educational Aids |
| 79. Tropical Fruits | 24.50 | CCM School Materials |
| 80. Weed Seeds | 12.75 | NASCO |

Specimens

| | | |
|---|---|---|
| 81. Fungus and Bacterial Diseases of Cultivated Plants | 13.50 | NASCO |
| 82. Harmful Weeds | 15.00 | CCM School Materials |
| 83. How Soils are Formed | 4.50 | NASCO |
| 84. Insects Harmful to Man | 9.85 | NASCO |
| 85. Plants Injurious to Man | 13.75 | CCM School Materials |
| 86. Poisonous Plants | 12.50 | CENCO Educational Aids |
| 87. Poisonous Plants | 9.85 | NASCO |
| 88. Soil Formation Display | 4.15 | NASCO |
| 89. Spider Set (Museum Mount) | 6.65 | CENCO Educational Aids |
| 90. Spider Types | 11.75 | CCM School Materials |

MATERIALS TO PURCHASE (Continued)

Transparencies

| | | |
|---|---|---|
| 91. Feeding Chain Simple Diagram | 1.50 | United Transparency |
| 92. Food Chain | 4.75 | GAF Reprographic |
| 93. Food Chain, The | 1.50 | United Transparency |
| 94. Food Pyramid | 4.75 | GAF Reprographic |
| 95. Life at the Seashore | 4.75 | GAF Reprographic |
| 96. Life in a Pond | 5.85 | GAF Reprographic |
| 97. Plant Disease Set | 94.55 | NASCO |
| 98. Typical Food Chain, A | 6.60 | CCM School Materials |

Workbook

| | | |
|---|---|---|
| 99. Plant Ecology Workbook | 5.00 | Burgess Publishing |

BEST COPY AVAILABLE

MASTER SHEET - LIFE SCIENCE THROUGH FIELD EXPERIENCES

| Objectives | Relevant Publications *Entire Publication | Media Units | Suggested Activities | Films | Transparencies | Records | Slides | Models | Speakers | Field Trips | Materials to Purchase |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | #2 pp. 24-41<br>#4 pp. 20, 25, 33-36, 46-98, 179-187<br>#9 *, 10*<br>#17 *, 21* | 1 | 1, 2 | 3,4,5,10, 35,41 | | | 10, 11 | 1,2,4, 8,9 | 3,4 | 4,6,7,8, 9,10 | 3,9,29,32,34, 41,42,51,60, 71,77,78,95, 99 |
| 2 | #1 Ch. 30<br>#2 pp. 4-24,28, 30,31<br>#7 *, 9*<br>#14 pp. 311-312,<br>#17 *<br>#22 p. 124<br>#31 * | 2 | 3 | 6,9,18,32, 33,39,40, 45 | | | 1,2,14 | | 4,5 | 4,7,9 | 3,4,8,9,29,34, 49,51,59.63, 71,77,78,91,92. 93,96,98,99 |
| 3 | #1 Ch. 30<br>#2 p. 47<br>#7 *, 9*<br>#11 *, 12*<br>#14 p. 306<br>#17 *, 18*<br>#31 * | 3 | 4 | 2,9,12,13, 18,27,30, 31,32,33, 34,36,39, 40,45 | 2 | | 1,2,3, 5,6,14 | 3 | 4,5 | 4,7 | 3,8,9,29,34,35, 38,44,50,51,55, 57,71,77,78,94, 99 |
| 4 | #9 *, 15*<br>#16 *, 17*<br>#22 pp. 49-80<br>#24 *, 27* | 4 | 5 | 7,8,14,15, 22,23,24, 25,26,29, 32,37,43, 44 | 1 | | 9,13 | 5,6,7 | 1,4 | 1,3,4,6, 10 | 5,11,13,15,16, 27,29,30,36,37, 43,47,51,53,56, 69,72,84,89,90 |
| 5 | #9 *, 17*<br>#19 *, 24*<br>#26 *, 27* | 5 | 6 | 28 | 3 | | 5.6 | | 1.2.4 | 1.2 | 12.19.29.51.74, 76,81,97 |
| 6 | #9 *, 12*<br>#17 *, 23*<br>#25 *, 27*<br>#29 * | 6 | 7 | 21 | | | | | 4 | 11 | 14,21,22,23,29, 52,58,61,62,73, 80,82 |
| 7 | #3 *, 7*<br>#8 *, 9*<br>#12 *, 16*<br>#17 *, 27*<br>#28 *, 30* | 7 | 8 | 1 | | | 5,6 | 10,11, 12 | 2,4 | 4,5,6, 7,10 | 2,24,25,28,29, 33,39,40,70,75, 85,86,87 |
| 8 | #3 *, 9*<br>#12 *, 13*<br>#17 *, 20*<br>#27 * | 8 | 9 | 19,20,38 | | | 4,5,6, 7,8,12 | | 1,2,4 | 1,2,5,6, 7,10 | 20,26,29,31,66, 67,79 |
| 9 | #1 Ch. 30<br>#2 pp. 11, 42-58<br>#7 *, 9*, 11*<br>#12 *, 17*<br>#18 *,<br>#22 pp. 17-48<br>#31 * | 9 | 10 | 11,12,16, 17,18,27, 32,39,40, 45,46 | 2 | 1 | 1,2,3, 14 | | 4 | 4,7 | 3,6,7,9,17,29, 34,45,64,65,71, 77,78,99 |
| 10 | #1 Ch. 30<br>#9 *, 12*<br>#17 *, 18*<br>#22 pp. 17-48<br>#31 * | 10 | 11 | 9,39,40, 42,45 | | | 1,2,3, 14 | | 4,5 | 4 | 1,3,9,10,29,34, 46,48,54,68,71, 77,78,83,88,89 |
| 11 | #6 *, 9*<br>#12 *, 17* | 11 | 12 | 9 | | | | | 4 | 3,4,6,10 | 1,10,18,20,34 |